

**METHODS OF PREPARING BRANCHED ALKYL AROMATIC HYDROCARBONS**

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**ABSTRACT**

Systems and methods to produce branched alkyl aromatic hydrocarbons are described.

Systems may include an olefin isomerization unit, an olefin dimerization unit, a

10 dehydrogenation-isomerization unit, an alkylation unit, a dehydrogenation unit, a hydrogenation unit and/or combinations thereof. Methods for producing branched alkyl aromatic hydrocarbons may include isomerization of olefins in a process stream. The isomerized olefins may be used to alkylate aromatic hydrocarbons. After alkylation of the aromatic hydrocarbons, unreacted components from the alkylation process may be separated from the alkyl aromatic hydrocarbons.

15 The unreacted components from the alkylation process may be recycled back into a process stream or sent to other processing units.